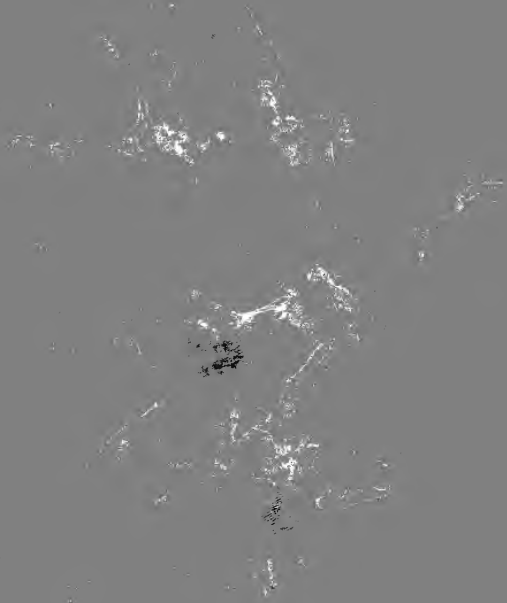

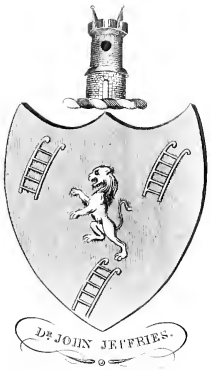

ILLUSTRATIONS

OF

SOME OF THE INJURIES

TO WHICH

THE LOWER LIMBS ARE EXPOSED.

By CHARLES BRANDON TRYE,

MEMBER OF THE LATE CORPORATION OF SURGEONS IN LONDON,
OF THE ROYAL MEDICAL SOCIETY IN EDINBURGH, OF THE MEDICAL SOCIETY
IN LONDON, AND SURGEON TO THE GLOUCESTER INFIRMARY.

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1802.

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New Street Square.

TO

The President, Vice Presidents, and Governors of the Gloucester Infirmary.

My Lords, and Gentlemen,

TO you I inſcribe the following Work, becauſe much of the knowledge, which it profeſſes to communicate, has been derived from that Inſtitution, which, for nearly twenty years, you have in part confided to my charge; an Inſtitution, which yields to none in the liberality with which it is ſupported, in its kindneſs to the objects of its care, and in the good management which prevails in all its departments.

Half a century has witneſſed the public approbation of the liberal ſyſtem adopted by its judicious and munificent Founders; and when the ordinary contributions have fallen ſhort of its purpoſes, extraordinary aid has been freely and generouſly given. Indeed, while the Infirmary retains its eminently good habits, can it aſk in vain for aſſiſtance proportioned to its neceſſities, addreſſing itſelf, as it may do with truth and

 juſtice,

juſtice, as forcibly to the intereſts of all who have a ſtake in the property and proſperity of this diſtrict, as to the feelings of thoſe who compaſſionate the complicated affliction of poverty, pain, and ſickneſs?

Never, then, may the ſphere of its beneficial influence, hitherto powerfully diffuſed throughout this county and its ſurrounding borders, be contracted; but may it for ever be *ſeen* and *felt* an extenſive public good, and conſequently flouriſh an object of public favour!—And may inſtruments to give effect to the bounty of its Donors never be wanting, ſuperior in abilities, and equal in zeal to

Gentlemen,

Your moſt devoted humble Servant,

CHARLES BRANDON TRYE.

ERRATA.

Page 11. *line* 1. *for* left *read* right
— 29. — 2. *for* ginglimus *read* ginglymus
— 35. — 31. *for* limb *read* trunk
— 36. — 12. *and* 16. *for* ginglimus *read* ginglymus

ILLUSTRATIONS,
&c. &c.

THE Thigh Bone is rarely diſlocated; for which reaſon the generality of practitioners muſt derive, what they know of this accident, from verbal deſcriptions alone, which, even if correct, will not always communicate clear ideas of the caſes they undertake to explain; ſo that many individuals in the profeſſion of ſurgery muſt be ſuppoſed to underſtand and diſtinguiſh ſuch caſes imperfectly, and of courſe be ill prepared to undertake their management.

I could ſpeak of fractures of the neck of the thigh bone, which had been taken for, and treated as diſlocations; and I could ſpeak of real diſlocations, whoſe nature had been overlooked, and whoſe reduction had never been thought of, till they had become inveterate, and incurable.

But to animadvert on thoſe, whoſe practice I have ſeen, or whoſe writings I have read, is not my object. Nor is it to go over the beaten ground of giving *general* deſcriptions of theſe injuries of the hip, and *general* directions in reſpect of their treatment. It is in *another*, and more *particular* way that I proceed, while I ſubmit this paper to the public.—For, as I have had opportunities of diſſecting theſe caſes recently after the receiving of the injury, which opportunities few, if any, are recorded to have had before me; and as I have taken opportunities, which none before me are recorded to have taken, of accurately delineating the preternatural appearances of ſuch caſes, I hope it is in my power to add ſomething to

the general ſtock of real information, and therefore, that I am juſtified in my preſent attempt.

Neither ſimple fractures, nor diſlocations of the hip joint, are mortal accidents; they muſt, in order to deſtroy life, be combined with additional miſchiefs. Such combinations having fallen in my way, the following publication will ſhew how far my induſtry availed itſelf of my ſituation. I will hope indeed, that I have not thrown away my time and labour, but that what I have done may conduce to the prevention of errors, which never fail to bring upon the patients torment, and perpetual lameneſs; and upon the ſurgeons reproach if not remorſe.

To my obſervations and tables reſpecting theſe injuries of the *hip*, I have ſubjoined a few remarks on certain derangements of the knee and the inſtep: they have the merit of correctneſs, and, I may ſuppoſe, of being new to ſome of the profeſſion.—They alſo contain a caſe which is without a parallel in any chirurgical hiſtory, which I have read, and remembered.

A FEW years ago a man diſlocated his hip joint, and at the ſame time he received a concuſſion of his brain, and grievous contuſions of the cheſt and belly; the other injuries prohibited all attempts to reduce the diſlocation, and he died on the 22d day after his accident. This ſubject furniſhed the firſt four tables.

The fifth, ſixth, and ſeventh plates are repreſentations of appearances in an elderly woman, who died of a dyſentery a few weeks after breaking the neck of the thigh bone.—Theſe form a contraſt with, and illuſtrate the preceding ones.

Diſlocation of the Thigh Bone.

PLATE I.

This Plate repreſents the ſubject lying *ſupine*.

The diſlocation was upwards and outwards.

The limb is ſhorter than its fellow, the knee is a little inflected, though leſs ſo than when the patient was living. The top of the right hip much higher than the ſame part of the left; and the outline of the hip and thigh is much more convex, than the outline on the oppoſite ſide.

The knee and the toes are turned inward; and the outer ankle, and at leaſt three quarters of the outſide of the thigh and leg, are in view.

Pub.d May 1.1798 by C.H. Tyler

PLATE II.

The body *prone*, and the integuments removed from the *pelvis* and thighs.

The knee turned inwards, and the greateſt part of the inner ſide of the thigh and leg and the foot are ſeen.

The heel of the right foot nearly on a level with the ankle of the left leg. The knee inflected.

The right *glutæi* muſcles have their *faſciculi* remarkably corrugated, and the direction of thoſe *faſciculi* is much leſs oblique than in the oppoſite limb. The *flexor* muſcles are ſhortened and very much bowed out.

The head of the bone lay under the *glutæus major*.

PLATE III.

Repreſents the ſubject, lying with the right ſide elevated, ſo as to permit the artiſt to delineate, in the ſtrongeſt manner, the moſt intereſting parts of the injured limb.

The *glutæus major*, under which (as was mentioned in the laſt page) the head of the bone lay, is raiſed, and turned backwards.

The head of the bone is diſcovered with its new attachment, conſiſting of a freſh formed ligamentous ſubſtance, united to the remains of the *ligamentum teres*.

This attaching ligament is rendered more conſpicuous by a bougé being placed under it.

The puckered ſtate of the *rotator* muſcles, which ariſe from the *pelvis*, is alſo perceptible; and the alteration in the figure of the *biceps* and of the *flexors*, whoſe tendons go to the *tibia*, is very well ſeen.

Pub.d May 1 1798 by C.B. Tovey

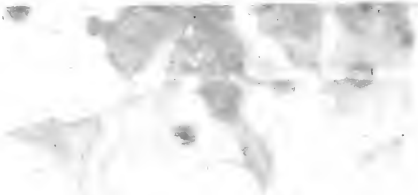


Plate 4.

Pub.d May 2. 1798. by C.B. Trye.

PLATE IV.

Is a repreſentation of the left *os innominatum*, ſeparated from its fellow, and from the *os ſacrum*.

The lacerated condition of the capſular ligament ariſing from the edge of the *acetabulum* is very well ſhewn: acroſs the *acetabulum* a new formed firm fleſhy ſubſtance is extended, which, it is probable, would have effectually prevented the return of the head of the bone into its ſocket, ſuppoſing the patient had recovered from his other injuries, and ſubmitted to the *taxis*.

A liberty has been taken with the third Plate, namely to repreſent the *acetabulum*, as it appeared after this fleſhy ſubſtance was taken away and the bone denuded. In the original drawing that ſubſtance was depicted, but it rendered other parts of the ſubject leſs diſtinct; and therefore I made this alteration.

PLATE V.

Repreſents a ſubject who had ſuſtained a *fracture* of the *neck* of the thigh bone. She died of a *viſceral* affection about ſix weeks after the injury.

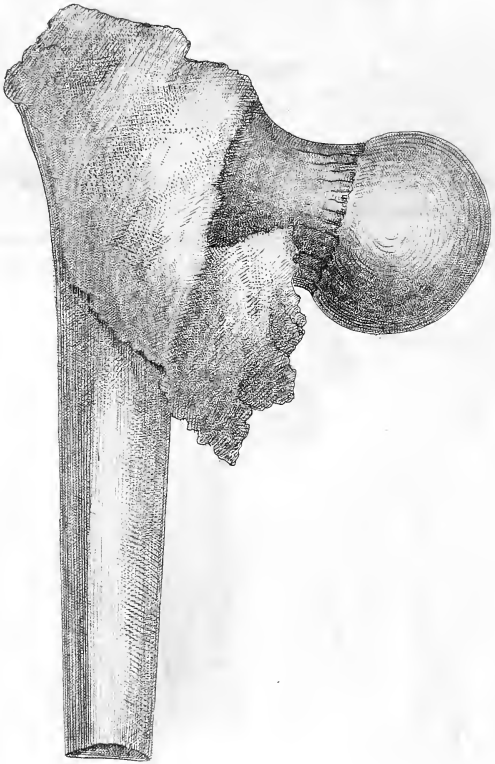
A front view only was thought neceſſary to be given. The ſubject lying ſupine on a platform.

The toes are turned outwards; the thigh reſting on its outer *condyle;* and the leg and foot on the *malleolus externus* and outſide of the foot.

Near the right flank is ſhewn a conſiderable ſwelling—the *apex* of which was in a line with the tubercle of the *os pubis*. The toe lying conſiderably nearer the lower end of the platform than the heel, and the outer ſide of the foot projecting farther forwards than the inſide, ſo as to ſhew a great part of the ſole of the foot; the heel reaching no lower than the inſertion of the *tendo achilles* of the oppoſite limb. The right *inguen* much more concave than the left.

Pub.d 1st. Nov.r 1802 by C. & J. Tyle

Plate 6.



Pub.d 4th Nov.r 1802. by C.B.Tye.

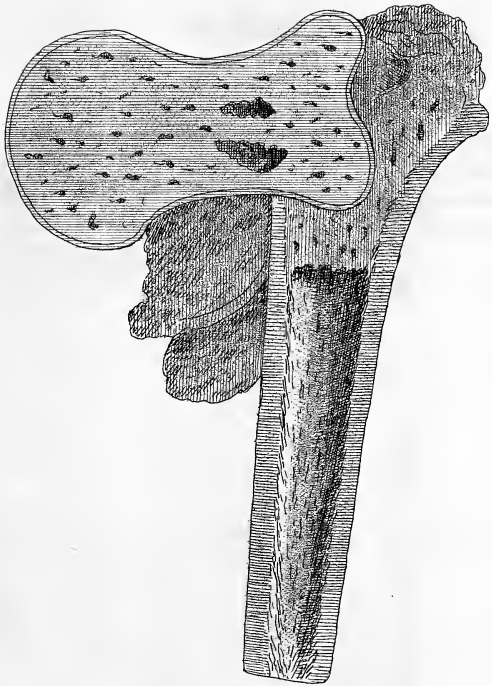
PLATE VI.

Repreſents the upper part of the thigh bone taken from the ſubject of the laſt plate.

PLATE VII.

Is a ſection of the ſame part.

The form in which the parts, originally ſeparated by the fracture, are again joined, will readily account for the ſhortening and diſtortion of the limb.



Pub.d 13th Nov.r 1801, by C.B.Trye.

Fracture of the Neck of the Thigh Bone.

An elderly woman received an injury of her right hip, by falling from her chair to the ground. In an examination made two weeks after the accident, the injured limb was found to be ſhorter than the other. When the point of the left heel (the patient lying on her back, with her knees ſtraightened,) reſted on the bed, the right foot lay on its outſide. When the feet were brought together, both knees being ſtraight, the bottom of the right heel could not be brought lower than the top of the left.

The right limb, when left to itſelf, had its knee a little inflected, its toes turned outward, and of courſe reſted upon the outer *condyle* of the thigh bone and the outer ankle. The great *trochanter* approached nearer to the *anterior ſuperior ſpinous proceſs* of the *ilium* than the other did, was thrown backwards, and was on a line with the upper edge of the *ſymphyſis* of the *pubis*, inſtead of being below it. The outline of the injured extremity, traced from the trunk to the knee, was much more convex than that of the oppoſite ſide. Attempts to ſtraighten the knee gave her great pain; but ſhe made no complaint when it was bent. No grating was felt in freely turning the limb about; in doing which, much leſs reſiſtance was given by the parts about the hip, than is made by them in a diſlocation. Preſſure on the groin created great pain.

She died about ſix weeks after the accident.

The body being laid ſupine on a plane, a drawing was made of its appearances, as far as could be repreſented in a front view. A deſcription of them is given with Plate the fifth. It is neceſſary alſo to deſcribe, what could not be repreſented without a back view,—that there was a conſiderable depreſſion or hollow on the buttock, owing to the derangement of the parts, as well as to the emaciation of the *glutæi* muſcles. On taking out the thigh bone the *capſular* ligament was found entire and ſound. The fractured parts were united, but not firmly. The neck of the bone was twiſted; the great *trochanter* being thrown backwards, and the neck of the bone of courſe forwards, ſo that the little *trochanter* lay very near to the head of the bone. The callus was very luxuriant, (ſee Plate VI.,) and had puſhed itſelf forwards, making the protuberance near the groin, which has been deſcribed above, and which is repreſented in the plate. The *trochanter* had riſen above the head of the bone. Several little ſpines were ſhot from the callus.

The bone being ſawed through longitudinally, the place of union of the fracture could be diſtinctly traced. This is evident in the ſeventh Plate.

Opportunities of diſſecting this caſe in a recent ſtate muſt be unuſual; the accident of itſelf being ſcarcely ever fatal.

In another woman, who died a month or ſix weeks after fracturing the neck of the thigh bone, no union of the fractured ends had taken place, but matter had been formed between them—it was not in a large quantity, nor had it been ſuſpected during her life. In both theſe caſes, the fracture was exterior to, and beyond the capſular ligament, which incloſes the *acetabulum* and part of the neck of the thigh

thigh bone. It was evidently the ſame in Mr. Cheſelden's caſe. See Cheſelden on the Bones. Table L. Fig. III.

It, doubtleſs, ſometimes happens that the bone is broken within the *capſular* ligament; but I apprehend it will be generally difficult to aſcertain the actual exiſtence of ſuch injury when the caſe is recent; for then the limb will be neither much ſhortened nor diſtorted, becauſe the parts will be retained in their proper ſituation by the ligament, ſuppoſing it to be entire, and in this caſe it probably is never otherwiſe. However, in proceſs of time, the ſhortening and diſtortion will both take place, as the abſorption of the fractured ends goes on, and the *capſular* ligament ſtretches and yields to the action of the muſcles of the *pelvis*. I have met with accidents in which it was ſuſpected at the firſt inſtant that the neck of the bone had been broken, but the fact could not be aſcertained by the moſt diligent and patient examination; however, in proceſs of time, that is to ſay, ſeveral weeks after the receiving of the hurt, the limb has become ſhortened, the toes turned outwards, and the *trochanter* raiſed higher than its natural ſituation. Fracture within the capſular ligament.

When the hip has ſuſtained a hurt by a fall or blow, it is of great importance both to the ſurgeon and patient to aſcertain its nature as far as it is poſſible while it is recent. If a diſlocation be overlooked, or miſtaken for a fracture, the patient will be unneceſſarily lamed for life. If, on the contrary, a fracture be miſtaken for a diſlocation, he will be expoſed to uſeleſs torture. And laſtly, if a fracture be entirely undiſcovered, or unnoticed though the overſight will, it is true, be little injurious to the patient, the ſurgeon will nevertheleſs be ſure to ſuffer in his reputation; and the future lameneſs and deformity, though in general not to be prevented by the earlieſt detection of the

nature of the injury, nor by the greateſt ſubſequent care, will be imputed to his negligence and ignorance.

Points to be attended to in an injury of the hip.

There are three points to which our attention ſhould be directed when we are about to examine an injured hip. The *ſymphyſis pubis*, the *anterior ſuperior ſpinous proceſs* of the *ilium*, and the *great trochanter*. Theſe, when in their natural ſtate, form a triangle, two of whoſe ſides are nearly equal, to wit, the ſide extending from the anterior ſuperior ſpinous proceſs of the ilium to the pubis, is nearly equal to that which reaches from the latter to the great trochanter; but the diſtance from the trochanter to the anterior ſuperior ſpinous proceſs of the ilium is ſomewhat ſhorter. If theſe points preſerve their proper relative bearings, we may in a manner determine that no fracture without the capſular ligament, nor any diſlocation, can exiſt. Sometimes when a blow has been received on the hip, the muſcles ariſing from the pelvis will be ſo affected by ſpaſm, as to throw a ſhade of obſcurity on the caſe. The thigh bone will appear to be pulled upwards, and the knee bent rigidly, the toes turned inwards or outwards, according to the particular muſcles at that time contracting themſelves. But in a little while, either ſpontaneouſly, or by the uſe of proper remedies, as fomentation, cupping, &c. the ſpaſms will ceaſe; and then, if our opinion, formed at firſt ſight, be wavering or erroneous, it may eaſily be fixed or corrected.

Of the treatment of the fracture.

In our treatment of fractures of the neck of the thigh bone, we can do little beſide obviating inflammation, and promoting the caſe of the patient by anodyne remedies, and by placing him in the moſt favourable poſition.

As to the bone, ſplints and bandages are ſcarcely of uſe; they can neither act upon the fractured ends, nor upon thoſe muſcles which are moſt likely to create irregularity. The *pyriformis*,

riformis, the *pſoas*, the *pectineus*, the *glutæi*, and indeed all which ariſe from the *pelvis*, and have their inſertions near the *trochanters*, are beyond our reach; and the tranverſe poſition of the neck, (which naturally makes almoſt a right angle with the head) and its being ſo very thickly covered with muſcle, puts the application of ſplints out of the queſtion. I will not ſay what may poſſibly be done by a mechanical contrivance, which ſhall keep the whole injured limb in a continual and uniform ſtate of extenſion; but I doubt if the benefit to be derived from it will be equivalent to the pain and trouble of the experiment. In theſe caſes I have taken great pains myſelf, and I have ſeen great pains taken by others; but I cannot recollect an adult patient who did not halt for ever after fracturing the neck of the thigh bone.

I do not write this to encourage practitioners to relax in their attention to thoſe who ſuffer in this way; but I think it right to ſtate thus far the reſult of my own obſervation, as it may hereafter have an influence in protecting ſome practitioner from unmerited reproach.

A broad flannel bandage rolled about the thigh and the correſponding *os innominatum*, has appeared to conduce to the eaſe of the patient.

Diſlocation of the Thigh Bone.

The thigh bone is liable to be diſlocated outwards and upwards, and inwards and downwards. Other modes of diſlocation are mentioned by authors, but having ſeen only theſe two, I cannot ſpeak of the reſt from my own knowledge.

Diſlocation upwards and outwards.

The diſlocation made upwards and outwards does not ſeem ſo rare as * Mr. Bell and other writers would induce us to believe. In this caſe the knee and toes will be turned inwards, the limb will be ſhortened, the knee more or leſs inflected, the thigh will appear rounder; there will be a hollowneſs in the groin, a fulneſs of the buttock, and there the head of the bone may be plainly felt, higher than, and at a greater or leſs diſtance from, the tuberoſity of the *iſchium*. Continual pain is perceived by the patient in the groin and buttock: He complains violently if we attempt to ſtreighten the knee, and likewiſe if we much increaſe its inflection.

Diſlocation inwards and downwards.

Of the diſlocation of the thigh bone made inwards and downwards, I do not apprehend that any deſcription will excel the one which is given by Mr. Travis in the ſecond volume of the London Medical Obſervations and Inquiries; and I ſay this in conſequence of having carefully compared his account with the facts which have preſented themſelves to my own eyes and fingers. He obſerves, that the knee and toe were not ſo much turned outwards, as from ſome deſcriptions of caſes he was led to expect. It may be pertinent to remark, that in this

* Mr. Bell ſays that this mode of diſlocation, compared with the other, is not more than once in twenty caſes. Bell's Syſtem of Surgery, vol. vi. p. 96.

diſlocation,

diſlocation, in which the head of the bone is thrown into the *foramen ovale*, the toes cannot be turned very much outwards, becauſe the *trochanter*, reſting upon the *ramus* of the *iſchium* will prevent that degree of diſtortion. I therefore take, as its principal characteriſtics, a hard tumour immediately over the foramen ovale, that is, ſomewhat more forwards than the tuberoſity of the iſchium, and at the bottom of the groin, (which tumour being ſometimes viſible to the eye, and always perceptible to the touch, is produced by the diſplaced head) the notable lengthening of the limb; its ſtradling, and its incapability of being brought cloſe to the other thigh, its hollowneſs, eſpecially near the uſual ſcite of the great *trochanter*, the abſence of the *trochanter* from its proper ſituation; and laſtly, an inability in the patient to lay his body ſtraight, and flat upon the back. Mr. Travis writes (Medical Obſervations and Inquiries, vol. ii. p. 100, 101):

" Juſt below the right groin, immediately over the foramen " ovale of the pubis, was a round hard tumour, which I " plainly perceived to be the head of the thigh bone; this, " by its preſſure on the crural nerve, occaſioned a numbneſs " downwards. On the outſide from the knee upwards, the " bone could not be felt higher than the middle of the thigh; " from thence it ſunk in the muſcles, and left a hollowneſs, " which increaſed gradually to the place diſtinguiſhed in the " ſound ſtate by the protuberance of the great trochanter. " There the cavity was large enough to have contained a man's " fiſt. The limb was evidently two inches longer than the " other, but ſtradled outwards and forwards, ſo that it could " neither be brought near the other knee, nor into the direc- " tion of the trunk; it admitted, however, of being raiſed to- " wards,

" wards his body, but not without increaſing his pain. The " knee and great toe were turned outwards, but not ſo much " as from ſome deſcriptions of ſuch caſes I had room to expect." This deſcription correſponded exactly with a caſe of fourteen days ſtanding; except that, in the latter, the hollowneſs on the outſide of the thigh was a leſs prominent feature; that there was a roundneſs on the inſide of the thigh, the outline of which was pretty convex; that there was no *viſible* round tumour in the groin, but a *palpable* great tenſion, and fulneſs ſomewhat more forwards than the tuberoſity of the iſchium, and there the head of the bone was certainly, though ſomewhat difficultly, perceived by the finger. After an effort or two had been made without accompliſhing the reduction, the head of the bone was found to be moved, and then the trochanter could be felt, though very much lower than its proper ſituation; by the next extenſion the reduction was effected.

I do not apprehend that any thing is neceſſary here to explain the mode of reduction. Mr. Travis and Dr. Kirkland appear to have ſaid every thing which can require to be added to the directions given by ſyſtematic writers.

Why are the knee and the toes turned inwards in the firſt kind of diſlocation, outwards in the ſecond, and ſtill more outwards in the fracture of the neck?

That we may anſwer this queſtion, it is neceſſary to conſider what are the powers by which the knee is turned outwards, what are thoſe which turn it inwards, and alſo the manner in which thoſe powers are affected in the ſeveral accidents? Mr. Cowper, in his ſplendid and elaborate work on the muſcles, does not attribute to any of the muſcles of the pelvis and thigh the office of turning the knee inwards. Nor

do

do I recollect any anatomiſt who has differed from him on this ſubject. It is not to be queſtioned that all the muſcles which are inſerted into or about the great trochanter, and all which ariſe from the *dorſum* and ſpine of the *ilium*, or from the *iſchium*, muſt turn the knee outwards. But as turning the knee inwards is a voluntary motion, there muſt be ſome muſcles provided to effect it. Mr. Cowper obſerves, that in conſequence of the oblique poſition of the head of the bone, there is a conſtant tendency in the toes to turn inwards. This obſervation may be juſt; but there is moreover a voluntary power which can rotate the limb much further than what would be the conſequence of ſimple quieſcence in the muſcles turning the limb outwards, and of the mechanical diſpoſition of the bone to turn inwards. This power reſides principally in the *pſoas*, the *iliacus internus*, and the *pectineus*, and theſe are occaſionally aſſiſted by one of the *adductors*, the *rectus cruris*, and the *gracilis*.

When the head of the bone falls out of its ſocket, all the muſcles inſerted in or about the great *trochanter* are in the condition of a pulley rope, which has ſlipped out of its groove, and therefore they loſe their power as rotators. If, in the luxation, the force be ſo applied as to drive the bone upwards, the tendon of the *pſoas* and *iliacus internus* being ſtill in its groove beneath the anterior ſuperior ſpine of the *ilium*, thoſe muſcles having now no antagoniſt to oppoſe, will draw the leſſer trochanter nearer to the pubis, and of courſe turn the knee inwards; beſides, if the bone be driven upwards, it muſt be abſolutely turned almoſt round before the knee can be turned outwards. When the neck of the bone is fractured, the operation of all the principal muſcles will be to draw the bone upwards and backwards.

Now

Now drawing the bone backwards will have the effect of turning the knee outwards, as will be evident to any one who will conſider the operation and inſertion of the *pyriformis* and the *gemelli*.

Of neceſſity then the toes will be turned outwards.—They have been ſo invariably in every inſtance which I have ſeen or heard of, and therefore I cannot but expreſs myſelf ſurprized, that in a publication * deſigned as a claſſical work, and a depoſitory of chirurgical knowledge, the knee and toes † turning inwards ſhould be given as a peculiarity of the fracture of the neck of the thigh bone, and a diagnoſtic diſtinguiſhing it from the diſlocation, when made forwards and downwards.

Reduction. The taxis or reduction of the diſlocated thigh bone is often a difficult operation.—I know of no mode which invariably promiſes ſucceſs. Much muſt be left to the ingenuity of the ſurgeon, who will vary the poſture of the patient, and the application of his own efforts to reduce the bone, as his judgment ſhall direct him in the inſtance before him.

One principle, however, I think may be laid down, viz. to fix the pelvis firmly, whenever extenſion of the limb is to be made.—In a ſtrong muſcular man, whoſe thigh had been diſlocated upwards and outwards, after fruitleſsly trying other methods the following proceſs ſucceeded. He was laid prone upon a bed; a ſheet was paſſed between his thighs, and held firmly by two aſſiſtants.—I then *knelt upon the pelvis*, in order to keep it ſteady, and reſiſt it's being raiſed up

* Bell's Surgery.

† Since this paper was prepared for the preſs, I have been perſuaded that examples of the toes turning inwards in fractures of the neck of the thigh bone, though extremely rare, may occur; but only in caſes in which uncommon violence has torn the attachments, or otherwiſe deſtroyed the actions, of the muſcles inſerted into the great trochanter. Such a caſe may impoſe itſelf upon even an experienced ſurgeon, if haſtily judging, for a diſlocation.

when the extenſion ſhould be made.—Three men then pulled at a towel, faſtened round the thigh, above the knee, and drew it in ſuch a direction as to carry the thigh upwards, that is, in relation to the trunk, backwards.—I then reſted my two hands on the head of the bone, and puſhed it downwards and forwards with all my ſtrength; and, after a ſhort exertion of our powers in this manner, I directed a Gentleman who held the leg, to twiſt the toes ſuddenly outwards, upon which the head ruſhed into the acetabulum with a loud noiſe.

I tried the ſame, and a variety of other methods in a very muſcular middle aged woman unſucceſsfully, within ſix hours after her accident. She took half a drachm of Dover's powder at bed-time the ſucceeding night, and the next morning uſed the warm bath, and was well ſweated for two hours before the intended time of repeating the taxis.—She was laid upon a bed, on the ſound ſide. I then preſſed my left hand againſt the head of the bone, one of my knees againſt its body, a little higher than the middle, and with the other hand I drew her knee outwards. The leg was ſupported by an aſſiſtant, the knee bent to a right angle.

Three perſons made ſteady the pelvis, by holding a ſheet paſſed between the thighs, and three others made the extenſion. In this manner our ſtrength was exerted for ſome time, and I plainly felt the head of the bone move, but the reduction was not completed. We renewed our attempts in the ſame manner, except that a Gentleman, who became one of the extenders, placed his foot firmly againſt the arch of the pubis, (properly defended,) and thereby both increaſed his power of extenſion, and at the ſame time rendered the pelvis more ſteady and fixed. The force being continued for ſome time,

and my hands and knee being applied in the manner already deſcribed, I directed the aſſiſtant, who ſupported the bent leg, ſuddenly to carry the internal ankle towards the other leg, and to twiſt the toes outwards, and then the head flipped into the acetabulum. The day on which the accident took place, there was uncommon rigidity and hardneſs of the muſcles; but after the operation of the ſudorific and the bath, the tenſion and reſiſtance were greatly diminiſhed.

I believe that the ſuffering parts in the diſlocation of the thigh recover themſelves much ſooner after a reduction has been effected, than the parts about the ſhoulder do, when that joint has undergone the ſame violence.

Compariſon of the luxation of the thigh with that of the humerus.

The thigh, when diſlocated, has an advantage over the diſlocated humerus, in as much as it is far more difficult to make a fixed point of the ſcapula, than of the pelvis. In pulling the arm the ſcapula is always dragged forwards with it, which muſt be a great mechanical diſadvantage to the ſurgeon, and renders the direction of his force leſs certain.

Of all the methods which I know of reducing the diſlocated humerus, that, which I am going to deſcribe, gives the ſurgeon the greateſt opportunities of applying his powers with mechanical advantage; and I think it will rarely fail, if the diſlocated head of the bone be in or near the axilla.

The patient muſt be ſeated on the ground, and properly fixed by a ſheet ſurrounding his body, and faſtened to ſome poſt or other fixture, or firmly held by aſſiſtants. The operator then places a flattiſh ball or pad in the axilla, and over that a towel, which he ties over one of his own ſhoulders, the length of the towel being ſo diminiſhed that he muſt ſtoop conſiderably in order that it may include in the loop both the ball in the axilla and the ſurgeon's

ſhoulder,

ſhoulder, but ſtill ſo as to leave him at liberty freely to uſe his hands. An extenſion being made by aſſiſtants in ſuch direction as he ſhall judge moſt expedient, ſtanding with his face to the patient, let him puſh with his left hand the proceſſus acromion of the ſcapula backwards and downwards, and with his right hand pull the humerus forwards and upwards, and by erecting his body he will be able to apply the entire ſum of his muſcular ſtrength in elevating or bringing forwards the head of the bone *.

I know no other way of reducing the humerus which allows the ſurgeon to employ his hands in any appropriate manœuvre, and at the ſame time gives him an opportunity of applying his whole muſcular ſtrength in aid of his co-operators. I believe I have tried every method which either books or the practice and communication of ſeveral ſurgeons have taught me, or my own ingenuity has ſuggeſted, and I give a preference to the mode which I have deſcribed. I am aware of the common objection to elevating the head of the bone; I mean its preſſing againſt the neck of the *ſcapula*, and there meeting with an impediment to its replacement.

But I think that, whoever will take the pains to examine the figure and ſituation of the human *ſcapula*, will ſee that this objection is raiſed upon no very ſolid grounds. For the anterior margin or inferior *coſta* of the ſcapula, which lies over the diſlocated head when ſeated in the axilla, is continued immediately from the *glenoid* cavity, and is bevelled all the way till it comes to the inferior angle. So that this bone will preſent little or no reſiſtance to the aſcent of a ſegment of a ſphere (the head of the humerus), even if it be elevated in a perpendicular direction; but if the ſurgeon, as he erects his body, recedes a little

* Or he may apply both hands to the ſcapula if one be not ſufficient to act upon that bone.

from the patient (which he ſhould always do), the elevation will be made in an oblique direction, and adapted to the inclined plane of the ſcapula. As for the cartilaginous lip, which increaſes the depth of the articular cavity, its elaſticity will prevent its proving any great obſtacle to the return of the head.

The fracture of the neck of the ſcapula, when made in attempting reduction, by hanging the arm of a patient over a door or ladder, or the top of a chair, is, I imagine, always produced independent of the preſſure of the head of the humerus, for in all ſuch attempts the ſcapula is brought much more forwards than it lies naturally, and the inferior angle is ſomewhat elevated—ſo that when the arm is drawn as far as poſſible over the edge of the door, or the round of the ladder, and firmly retained in that ſituation, the whole weight of the body, when the ſupport of the patient's feet is taken away, muſt be thrown with a jerk upon the *cervix* of the ſcapula. Beſides, in moſt of theſe obſtinate caſes, the head of the humerus will have been thrown forwards under the pectoral muſcle, and be out of way of doing immediate miſchief by ſtriking againſt the neck of the ſcapula.

If the extenſion be made in a proper direction, ſo as to bring the head of the bone to a level with the edge of the articular cavity, I believe that, in general, "the muſcles will "do the reſt for the ſurgeon*;" but if the extenſion do not bring it to that level, though by leſs than the tenth of an inch, the muſcles will not then do their work in the way the ſurgeon wiſhes them; for if they act at all, it will be in retracting the bone towards its former unnatural ſituation. Whereas if, beſide the extenſion, the bone be aſſiſted by a lever acting in a proper direction, it will be eaſily lifted over a ſmall aſcent,

* Pott's Works.

and

and then the aid of the muſcles will become efficient. In the luxations of all the ginglimus joints, and of the patella, it is neceſſary, in order to reduce them, to do ſomething more than merely making an extenſion: and the principles of their treatment are applicable to the injuries of the articulation, called *enarthroſis* and *arthrodia*.

Where the humerus was fractured in its middle at the ſame time that its head was diſplaced, I found nothing neceſſary more than ſlightly to draw the head of the bone forwards, and then lift it into its ſocket. Here the muſcles were altogether paſſive, and the bone of courſe met with no reſiſtance when it was lifted into its cavity.

There is another injury to which a part of the lower extremity is ſubject, and which is of a very ſerious nature, in as much as it muſt always threaten a permanent lameneſs to the patient, I mean the diſlocation of the *aſtragalus* or inſtep. A complete diſlocation of this bone is a very rare occurrence; a partial diſplacement is, however, by no means uncommon. Of the former I met with a diſtreſſing inſtance, which I will deſcribe, and afterwards I ſhall take the liberty of making a few remarks on the latter circumſtance.

Diſlocation of the aſtragalus.

Compound Diſlocation of the Aſtragalus.

Mrs. Palmer, aged 60, about ſeven in the evening, March 24th, 1789, was thrown from her horſe, and her foot hanging in the ſtirrup, ſhe was dragged ſome yards—and when diſengaged, was found with a large wound in her left foot, and, as it was ſuppoſed, with the ankle joint diſplaced.

I ſaw her the next morning in company with her ſon, a neighbouring practitioner in medicine. A careful examination of the caſe demonſtrated it to be a diſlocation not of the ankle joint, but of the *tarſus*.

The following were the appearances.

The foot greatly miſhapen, and in reſpect of the leg, turned inwards, and downwards; on the upper part of the inſtep, and moſtly to the outſide, was a large lacerated wound, through which a bone with two proceſſes was protruded at leaſt two inches. This was the *aſtragalus*. The *os calcis* was alſo diſplaced from its articulation with the *os cuboides*, but not from its articulation with the *aſtragalus*, and did not protrude itſelf. Some of the articular cartilage was abraded from the projected apophyſis, which was dry and black. The tendon of the *tibialis anticus* was bare to the view. The wound was freely enlarged by inciſion, but I could not by any means replace the luxated bones, the parts were ſo jammed together.

There was now nothing to be thought of but the alternative of amputating the leg, or of removing the *aſtragalus*, which laſt appeared a bold and precarious remedy, altogether unprecedented as far as I knew; and to be an experiment, of which the event muſt be doubtful; ſince, although it ſhould preſerve both

both the life and the limb of the patient, ſtill it muſt be a queſtion whether that limb would not be uſeleſs and incapable of ſupporting the body in ſtanding, and ſtill more in walking, it's tibia and fibula having loſt their baſe. However, the trial, ſeemed juſtifiable; firſt, as immediate amputation was not unobjectionable, becauſe a conſiderable degree of tenſion of the leg was already come on; and ſecondly, as it might be a means of averting inſtant danger, ſince it would give general freedom to all the parts, and thus relieve tenſion, and at any rate afford a probability of poſtponing amputation till it could be performed with ſafety, and an aſſurance of ſucceſs.

Accordingly I cut out the aſtragalus, which was done without much difficulty. I laid the leg on its outſide, with the knee bent. A conſiderable diſcharge of ſynovia continued for ſome days. Pain, and inflammation of the leg and foot, ſucceeded the operation, and an abſceſs was formed on the inſide of the leg, a little above the ankle. Nothing beſides worth noticing occurred in the courſe of the cure, which was effected in eighteen weeks. In ſix months ſhe walked very well with the aſſiſtance of one ſtick, and with wearing an iron, which reached from the hip, had a joint at the knee, and was fixed into the ſole of a high heeled ſhoe; the limb was not much ſhorter than the other, and there was a little vertical motion between the leg and the foot; ſo that a new articulation muſt have been formed, between the extremity of the *tibia*, and its new ſupporters, the *os calcis*, and *os cuboides*.

This compound luxation of the aſtragalus may be ſpoken of as a very rare and unuſual caſe. Even a perfect luxation, without a wound, is by no means frequent. But there is another affection of theſe parts which is very common, and productive of a great deal of miſery. This is a ſubluxation

Subluxation of the aſtragalus.

of the aſtragalus. Sudden violence often produces it; but it very frequently, and indeed moſt commonly, ariſes from a weakneſs of the ligaments in the foot, and then a deformity of the part *gradually* increaſes. Young perſons, who grow tall and thin, and have occaſion to carry heavy weights, or whoſe occupation requires them to be ſtanding the greater part of the day, are the moſt ſubject to it: in ſome the diſlocation is inwards, and then the toes turn out; theſe are ſaid to walk upon their inner ankle; in others it is outwards, and in theſe the toes turn inward, and the patient walks almoſt upon the outward ankle. I ſuſpect the muſcles to be partly in fault in theſe ſpontaneous ſubluxations, the *peronci* acting in exceſs in the one caſe, the *tibiales* in the other. I have obſerved to a certainty that it has been ſo in the latter caſe, though whether the inordinate action of the tibiales was the primary cauſe, or whether it was in the firſt inſtance an effect of the giving way of the ligaments, I cannot decide.

Luxation inwards moſt common.

The more common of the two is the ſubluxation inwards; it has been often miſtaken for a diſlocation of the ankle joint, and extenſion has been ineffectually employed to reſtore the parts to their original ſituation. Bandages and plaſters, with confinement to bed, have been tediouſly and uſeleſsly had recourſe to, and as a great deal of dull pain is felt by many*, rheumatiſm comes in for its ſhare of blame, and antirheumatics have in vain been preſcribed. Sometimes one, often both, feet ſuffer deformity and the concomitant pain.

The cure.

The cure, if the diſeaſe be not very inveterate, and the ſubject be young, is not difficult. It is only requiſite to

* Rheumatiſm, however, is ſometimes the original cauſe of it, by having inflamed and weakened the ligaments of the foot.

forbid

forbid the patient's continuing long at a time in a ſtanding poſture, and to reſtrain him from immoderate walking, and eſpecially under the weight of a burden. To theſe injunctions it is neceſſary to add the uſe of a ſhoe, made in the following manner: The ſole muſt be thicker on the inſide than on the outſide, and this in a greater degree in proportion to the greater deformity of the foot. The ſole muſt alſo on the inſide have its bottom projecting ſome ſpace (from half an inch to an inch) beyond the upper leather; and in order to preſerve the ſole from twiſting or bending, a thin plate of iron may be introduced between its lamellæ. The quarter of the upper leather ſhould reach and be laced ſome little at leaſt higher than the ankle, and the inſide quarter ſhould be ſtiffened. By the aſſiſtance of ſuch a ſhoe, I have known ſome who were extremely lame, enabled almoſt immediately to walk with eaſe and freedom. I have not known many who have not in the ſpace of a few weeks obtained a reſtoration of the ſhape and uſe of the foot, and none who have not received very ample relief. In this caſe there is a ſubluxation of the *aſtragalus* and *os naviculare* from their reſpective articulations with the *os calcis*, the *cuboides*, and the *cuneiform* bones. Whoever will attentively conſider the mechaniſm of the human foot, will readily account for the inconveniency which muſt be experienced by a patient labouring under the injury which I have been deſcribing, and comprehend the advantages which muſt neceſſarily follow the aſſiſtance which I have recommended.

The oppoſite deviation from the natural poſition of the bones is much more rare, I mean where the foot is turned inward, and the patient treads almoſt on the outer ankle. All which ſeems neceſſary, or indeed which can be done, is to form the ſole and quarter of a ſhoe on the outer ſide as I

have directed them to be formed on the inner ſide, and to comply with the before given injunction, eſpecially in reſpect of motion and reſt; and I can aſſert from experience this may be done with ſucceſs. The turning in of the toes may be greatly counteracted by ſitting with the feet often in the ſtocks, which are in uſe in dancing ſchools.

Deformity of the knees and legs.

In weakly children a deformity of the knees, or of the legs, frequently accompanies the deformity of the tarſus; however it always ariſes ſpontaneouſly. The deformities of theſe parts are what are vulgarly called the knock'd knee, and the bandy leg. Often, indeed, they exiſt without any deformity of the foot or ankle. It will be eaſily underſtood that when the hard parts of the inferior extremities are too weak to duly ſupport the weight of the body in ſtanding and in walking, (and eſpecially if heavy burthens be carried by the individual,) either the bones will bend, or the joints give way. In the latter caſe, (which is the knock'd knee,) inſtead of the leg and thigh forming nearly a ſtraight line, the body being erect, they will make a leſs or greater angle whoſe ſides will meet in the knee joint, which will now bulge on the inſide, and be rather hollow on the outſide. Whatever may be the appearance, there is in fact no diſlocation; for the *condyles* of the *os femoris* continue to be applied to their reſpective *concave articular ſurfaces* of the tibia; but then the connection is new modified, and the outer condyle acquires a more ſpacious reſting-place on the head of the tibia, while the inner condyle has its bearing place leſſened. Now this ſituation of the bones muſt be extremely inconvenient to the muſcles of the limb; for which reaſon, thoſe who are very much knock-kneed, do not either walk gracefully or run with facility and ſpeed; nor are they fitted, however robuſt

robuſt in other reſpects, for carrying heavy burthens. Bandy legs, on the contrary, if the general ſtrength be ſufficient, produce little inconveniency, except ſhortening in a right line, the length of the limb, and thus leſſening the ſtride in progreſſion.

Both theſe kinds of deformity are always to be leſſened, and generally to be fully corrected in early life, and while the powers of growth and abſorption are active.

This is to be done by the judicious uſe of irons. I think it unneceſſary to inquire into the objections which may be made to theſe inſtruments, becauſe I believe that, when I have explained the principles upon which they ought to be made and applied, objections will ceaſe. Irons recommended.

Firſt, the irons ſhould ſupport the weight of the trunk, and remove that weight from bearing upon the knees and legs. How to be conſtructed.

Secondly, the irons ſhould not impede any of the movements of the joints.

And thirdly, they ſhould neither preſs upon nor incumber the muſcles.

I ſhall preface the commenting on theſe principles by remarking, that the action of the muſcles during childhood and early youth has a conſtant tendency to correct the deformity, and that they will correct it, if the effect of preſſure from above on the bones and joints be not greater than the power of the muſcles can overcome. In confirmation of this remark, let us recollect the ſeveral individuals whom we ſaw with knock'd knees and crooked legs in their infancy, whoſe limbs, without any mechanical aſſiſtance, became perfectly ſtraight as they grew up.

" Firſt, they ſhould ſupport the weight of the limb."

For this purpoſe the iron ſhould have one end fixed in a broad and ſtrong girdle, firmly embracing the body, and the other end rivetted in the ſole of the ſhoe.

" Secondly, they ſhould not impede any of the movements of the joints."

This can be effected only by making their joints to correſpond both in ſituation and movement with the joints of the body.

The hip is a ball and ſocket joint, and therefore has *mobility* in every direction. Now a ball and ſocket joint is not eaſily conſtructed in iron, and beſides would take up too much room; therefore, two joints are to be ſubſtituted in its place, the one a rule joint, the other a ſwivel joint, by the combination of which two, every motion may be obtained.

The knee is a *ginglimus*, and has a vertical motion only: a rule joint or hinge is ſufficient in this part of the iron, but like the knee ſhould have no motion forwards beyond the perpendicular line, and therefore ſhould be furniſhed with a ſtop.

The ankle is a *ginglimus* joint with ſome lateral motion, notwithſtanding which it is only neceſſary there to make the iron with a joint ſimilar to that recommended at the knee; for the little lateral motion of the ankle joint will not be at all impeded by the iron joint being confined to move in only one direction, that is backwards and forwards, becauſe the iron will, in conſequence of its length, yield a little to a lateral impulſe.

" Thirdly, the iron ſhould neither preſs upon, nor incumber the muſcles."

The irons, therefore, ſhould be as light as it is poſſible to make them, conſiſtent with a ſufficiency of ſtrength; indeed they ſhould be compoſed in part, if not entirely, of ſteel. And as they muſt be connected by leather belts to the thigh and to the leg, thoſe belts ſhould be broad, well padded, and buckled on looſely, the purpoſe of them being nothing more than to keep the iron in one ſituation, in reſpect of the limb.

The club foot is the laſt deformity of the lower extremity which I take occaſion to notice. If attended to in early infancy, it may in general be corrected. The method propoſed in Mr. Cheſelden's Obſervations, annexed to Gataker's Tranſlation of Le Dran's Surgery, has this inconveniency, that the time required for ſufficiently drying the paſte which he recommends, is very long; and the application requires to be frequently changed, if wetted by the child's urine. Fine alabaſter may be ſubſtituted for wheat flour, and uſed in the manner of making moulds for caſts; and will be free from theſe objections. I have uſed it, however, only in one inſtance. Club foot.

Steel ſprings may certainly be applied with ſtill better effect by an ingenious mechanic; but ſurgeons will rarely find workmen capable of executing their plans with neatneſs and efficacy in theſe inſtances.

Mr. Sheldrake, of the Strand, London, appears to have conceived very clear ideas of theſe caſes, and to render all the aſſiſtance of which his art is capable.

FINIS.

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